



SEQUENCE LISTING

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<120> DNA ENCODING APOPTOSIS-INDUCED eIF-5A AND DHS AND A
METHOD FOR CONTROLLING APOPTOSIS

<130> 10799/13

<140> 09/909,796

<141> 2001-07-23

<160> 21

<170> PatentIn Ver. 2.1

<210> 1

<211> 1139

<212> DNA

<213> Rattus sp.

<220>

<221> CDS

<222> (33)..(494)

<400> 1
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Met Ala Asp Asp Leu Asp Phe
1 5

gag aca gga gat gca ggg gcc tca gcc acc ttc cca atg cag tgc tca 101
Glu Thr Gly Asp Ala Gly Ala Ser Ala Thr Phe Pro Met Gln Cys Ser
10 15 20

gca tta cgt aag aat ggt ttt gtg gtg ctc aag ggc cgg cca tgt aag 149
Ala Leu Arg Lys Asn Gly Phe Val Val Leu Lys Gly Arg Pro Cys Lys
25 30 35

atc gtc gag atg tct act tcg aag act ggc aag cat ggc cat gcc aag 197
Ile Val Glu Met Ser Thr Ser Lys Thr Gly Lys His Gly His Ala Lys
40 45 50 55

gtc cat ctg gtt ggt att gat att ttt act ggg aag aaa tat gaa gat 245
Val His Leu Val Gly Ile Asp Ile Phe Thr Gly Lys Lys Tyr Glu Asp
60 65 70

atc tgc ccg tcg act cat aac atg gat gtc ccc aac atc aaa agg aat 293
Ile Cys Pro Ser Thr His Asn Met Asp Val Pro Asn Ile Lys Arg Asn
75 80 85

gat ttc cag ctg att ggc atc cag gat ggg tac cta tcc ctg ctc cag 341
Asp Phe Gln Leu Ile Gly Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln
90 95 100

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gac agt ggg gag gta cga gag gac ctt cgt ctg cct gag gga gac ctt 389
Asp Ser Gly Glu Val Arg Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu
105 110 115

ggc aag gag att gag cag aag tat gac tgt gga gaa gag atc ctg atc 437
Gly Lys Glu Ile Glu Gln Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile
120 125 130 135

aca gtg ctg tcc gcc atg aca gag gag gca gct gtt gca atc aag gcc 485
Thr Val Leu Ser Ala Met Thr Glu Glu Ala Ala Val Ala Ile Lys Ala
140 145 150

atg gca aaa taactggctt ccagggtggc ggtgggtggca gcagtgatcc 534
Met Ala Lys

atgagcctac agaggccccct ccccagctc tggctggggcc cttggctgga ctcctatcca 594

atattatttga cgtttttatct tggttttcct cacccttca aactgtcggg gagaccctgc 654

ccttcaccta gctcccttgg ccaggcatga gggagccatg gccttgggtga agctacctgc 714

ctcttctctc gcagccctga tgggggaaag ggagtgggta ctgcctgtgg tttaggttcc 774

cctctccctt tttcttttta attcaatttg gaatcagaaa gctgtggatt ctggcaaattg 834

gtcttgtgtc ctttatecca ctcaaaccce tctgggtccc tgttctccat agtccttcac 894

ccccaagcac cactgacaga ctggggacca gcccccttcc ctgcctgtgt ctcttcccaa 954

acccctctat aggggtgaca agaagaggag ggggggaggg gacacgatcc ctcctcaggc 1014

atctgggaag gccttgcccc catgggcttt accctttcct gtgggctttc tccttgacac 1074

atttggtaaa aatcaaacct gaataaaact acaagtttaa tatgaaaaaa aaaaaaaaaa 1134

aaaaa 1139

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<210> 2

<211> 154

<212> PRT

<213> Rattus sp.

<400> 2

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Met Ala Asp Asp Leu Asp Phe Glu Thr Gly Asp Ala Gly Ala Ser Ala
1 5 10 15

Thr Phe Pro Met Gln Cys Ser Ala Leu Arg Lys Asn Gly Phe Val Val
20 25 30

Leu Lys Gly Arg Pro Cys Lys Ile Val Glu Met Ser Thr Ser Lys Thr
35 40 45

Gly Lys His Gly His Ala Lys Val His Leu Val Gly Ile Asp Ile Phe
50 55 60

```

Thr Gly Lys Lys Tyr Glu Asp Ile Cys Pro Ser Thr His Asn Met Asp
 65 70 75 80
 Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly Ile Gln Asp
 85 90 95
 Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg Glu Asp Leu
 100 105 110
 Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln Lys Tyr Asp
 115 120 125
 Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met Thr Glu Glu
 130 135 140
 Ala Ala Val Ala Ile Lys Ala Met Ala Lys
 145 150

<210> 3
 <211> 462
 <212> DNA
 <213> Homo sapiens

<400> 3
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 cagtgtctcag cattacgtaa gaatggcttt gtggtgctca aaggcgggcc atgtaagatc 120
 gtcgagatgt ctacttcgaa gactggcaag cacggccacg ccaagggtcca tctggttggg 180
 attgacatct ttactgggaa gaaatatgaa gatattctgcc cgtcaactca taatatggat 240
 gtccccaaca tcaaaaggaa tgacttccag ctgattggca tccaggatgg gtacctatca 300
 ctgctccagg acagcgggga ggtacgagag gaccttcgtc tccctgaggg agaccttggc 360
 aaggagattg agcagaagta cgactgtgga gaagagatcc tgatcacggg gctgtctgcc 420
 atgacagagg aggcagctgt tgcaatcaag gccatggcaa aa 462

<210> 4
 <211> 462
 <212> DNA
 <213> Homo sapiens

<220>
 <221> modified_base
 <222> (455)..(456)
 <223> a, t, c or g

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 cagtgtctcg ccttgcgcaa aaacggcttc gtggtgctca aaggacgacc atgcaaaata 120
 gtggagatgt caacttccaa aactggaaag catggtcatg ccaagggttca ccttggttga 180
 attgatattt tcacgggcaa aaaatatgaa gatatttgtc cttctactca caacatggat 240
 gttccaaata ttaagagaaa tgattatcaa ctgatatgca ttcaagatgg ttacctttcc 300
 ctgctgacag aaactggtga agttcgtgag gatcttaaac tgccagaagg tgaactaggc 360
 aaagaaatag agggaaaata caatgcaggt gaagatgtac aggtgtctgt catgtgtgca 420
 atgagtgaag aatatgctgt agccataaaa ccctnngcaa at 462

<210> 5
 <211> 462
 <212> DNA
 <213> Homo sapiens

<400> 5
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 cagtgtctcag cattacgtaa gaatggtttt gtgggtgtca aaggccggcc atgtaagatc 120
 gtcgagatgt ctacttcgaa gactggcaag catggccatg ccaaggtcca tctggttggc 180
 attgacattt ttactgggaa gaaatatgaa gatatctgcc cgtcgactca taatatggat 240
 gtccccaaca tcaaacggaa tgacttccag ctgattggca tccaggatgg gtacctatcc 300
 ctgctccagg acagtgggga ggtacgagag gaccttcgtc tgcctgaagg agaccttggc 360
 aaggagattg agcagaagta tgactgtgga gaagagatcc tgatcacagt gctgtctgcc 420
 atgacagagg aggcagctgt tgcaatcaag gccatggcaa aa 462

<210> 6
 <211> 606
 <212> DNA
 <213> Rattus sp.

<220>
 <221> CDS
 <222> (1)..(453)

<400> 6
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 Ala Val Tyr Tyr Trp Ala His Lys Asn His Ile Pro Val Leu Ser Pro
 1 5 10 15
 gca ctc aca gac ggc tca ctg ggt gac atg atc ttt ttc cat tcc tat 96
 Ala Leu Thr Asp Gly Ser Leu Gly Asp Met Ile Phe Phe His Ser Tyr
 20 25 30
 aaa aac cca ggc ttg gtc ctg gac atc gtt gaa gac ctg cgg ctc atc 144
 Lys Asn Pro Gly Leu Val Leu Asp Ile Val Glu Asp Leu Arg Leu Ile
 35 40 45
 aac atg cag gcc att ttc gcc aag cgc act ggg atg atc atc ctg ggt 192
 Asn Met Gln Ala Ile Phe Ala Lys Arg Thr Gly Met Ile Ile Leu Gly
 50 55 60
 gga ggc gtg gtc aag cac cac atc gcc aat gct aac ctc atg cgg aat 240
 Gly Gly Val Val Lys His His Ile Ala Asn Ala Asn Leu Met Arg Asn
 65 70 75 80
 gga gct gac tac gct gtt tat atc aac aca gcc cag gag ttt gat ggc 288
 Gly Ala Asp Tyr Ala Val Tyr Ile Asn Thr Ala Gln Glu Phe Asp Gly
 85 90 95
 tca gac tca gga gcc cgg cca gat gag gct gtc tcc tgg ggc aag atc 336
 Ser Asp Ser Gly Ala Arg Pro Asp Glu Ala Val Ser Trp Gly Lys Ile
 100 105 110
 cgg atg gat gca cag cca gta aag gtc tat gct gat gca tct ctg gtt 384
 Arg Met Asp Ala Gln Pro Val Lys Val Tyr Ala Asp Ala Ser Leu Val
 115 120 125

ttc ccc ttg ctg gtg gct gag aca ttc gcc caa aag gca gat gcc ttc 432
 Phe Pro Leu Leu Val Ala Glu Thr Phe Ala Gln Lys Ala Asp Ala Phe
 130 135 140

aga gct gag aag aat gag gac tgagcagatg ggtaaagacg gaggttctg 483
 Arg Ala Glu Lys Asn Glu Asp
 145 150

ccacaccttt atttattatt tgcataccaa cccctcctgg gccctctcct tggtcagcag 543

catcttgaga ataaatggcc tttttgttgg tttctgtaaa aaaaggactt taaaaaaaaa 603

aaa 606

<210> 7

<211> 151

<212> PRT

<213> Rattus sp.

<400> 7

Ala Val Tyr Tyr Trp Ala His Lys Asn His Ile Pro Val Leu Ser Pro
 1 5 10 15

Ala Leu Thr Asp Gly Ser Leu Gly Asp Met Ile Phe Phe His Ser Tyr
 20 25 30

Lys Asn Pro Gly Leu Val Leu Asp Ile Val Glu Asp Leu Arg Leu Ile
 35 40 45

Asn Met Gln Ala Ile Phe Ala Lys Arg Thr Gly Met Ile Ile Leu Gly
 50 55 60

Gly Gly Val Val Lys His His Ile Ala Asn Ala Asn Leu Met Arg Asn
 65 70 75 80

Gly Ala Asp Tyr Ala Val Tyr Ile Asn Thr Ala Gln Glu Phe Asp Gly
 85 90 95

Ser Asp Ser Gly Ala Arg Pro Asp Glu Ala Val Ser Trp Gly Lys Ile
 100 105 110

Arg Met Asp Ala Gln Pro Val Lys Val Tyr Ala Asp Ala Ser Leu Val
 115 120 125

Phe Pro Leu Leu Val Ala Glu Thr Phe Ala Gln Lys Ala Asp Ala Phe
 130 135 140

Arg Ala Glu Lys Asn Glu Asp
 145 150

<210> 8

<211> 453

<212> DNA

<213> Homo sapiens

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<400> 8
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ggctcgctgg gcgacatgat cttcttccat tcctacaaga acccgggcct ggtcctggac 120
atcgttgagg acctgaggct catcaacaca caggccatct ttgccaagtg cactgggatg 180
atcattctgg gcgggggctg ggtcaagcac cacattgcca atgccaacct catgcggaac 240
ggggccgact acgctgttta catcaacaca gcccgagggt ttgatggctc tgactcaggt 300
gcccgaccag acgaggctgt ctcttggggc aagatccggg tggatgcaca gcccgtcaag 360
gtctatgctg acgctccct ggtcttcccc ctgcttgtgg ctgaaacctt tgcccagaag 420
atggatgcct tcatgcatga gaagaacgag gac 453

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<210> 9
<211> 20
<212> DNA
<213> Artificial Sequence

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<220>
<223> Description of Artificial Sequence: Primer

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<220>
<221> modified_base
<222> (12)
<223> a, t, c or g

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<400> 9
tcsaarachg gnaagcaygg 20

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<210> 10
<211> 42
<212> DNA
<213> Artificial Sequence

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<220>
<223> Description of Artificial Sequence: Primer

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<400> 10
gcgaagcttc catggctcga gttttttttt tttttttttt tt 42

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<210> 11
<211> 972
<212> DNA
<213> Rattus sp.

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<220>
<221> CDS
<222> (1)..(327)

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<400> 11
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Ser Lys Thr Gly Lys His Gly His Ala Lys Val His Leu Val Gly Ile
1 5 10 15

gat att ttt act ggg aag aaa tat gaa gat atc tgc ccg tcg act cat 96
Asp Ile Phe Thr Gly Lys Lys Tyr Glu Asp Ile Cys Pro Ser Thr His
20 25 30

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aac atg gat gtc ccc aac atc aaa agg aat gat ttc cag ctg att ggc 144
Asn Met Asp Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly
      35              40              45

atc cag gat ggg tac cta tcc ctg ctc cag gac agt ggg gag gta cga 192
Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg
      50              55              60

gag gac ctt cgt ctg cct gag gga gac ctt ggc aag gag att gag cag 240
Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln
      65              70              75              80

aag tat gac tgt gga gaa gag atc ctg atc aca gtg ctg tcc gcc atg 288
Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met
      85              90              95

aca gag gag gca gct gtt gca atc aag gcc atg gca aaa taactggcct 337
Thr Glu Glu Ala Ala Val Ala Ile Lys Ala Met Ala Lys
      100              105

ccaggggtggc ggtggtggca gcagtgatcc atgagcctac agaggccct cccccagctc 397
tggtctgggcc cttggtgga ctctatcca atttattga cgttttattt tggttttcct 457
cacccttcca aactgtcggg gagaccctgc cttcaccta gtcctcttgg ccaggcatga 517
gggagccatg gccttggtga agctacctgc ctcttctctc gcagccctga tgggggaaag 577
ggagtgggta ctgectgtgg tttaggttcc cctctccctt tttcttttta attcaatttg 637
gaatcagaaa gctgtggatt ctggcaaatg gtcttgtgtc ctttatccca ctcaaaccce 697
tctggtcccc tgttctccat agtccttcac cccaagcac cactgacaga ctggggacca 757
gcccccttcc ctgectgtgt ctcttcccaa acccctctat aggggtgaca agaaggagg 817
ggggggaggg gacacgatcc ctctcaggc atctgggaag gccttgcccc catgggcttt 877
accctttcct gtgggctttc tccctgacac atttgttaaa aatcaaacct gaataaaact 937
acaagtttaa tatgaaaaaa aaaaaaaaaa aaaaaa 972

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<210> 12
 <211> 109
 <212> PRT
 <213> Rattus sp.

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<400> 12
Ser Lys Thr Gly Lys His Gly His Ala Lys Val His Leu Val Gly Ile
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Asp Ile Phe Thr Gly Lys Lys Tyr Glu Asp Ile Cys Pro Ser Thr His
      20              25              30

Asn Met Asp Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly
      35              40              45

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Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg
50 55 60

Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln
65 70 75 80

Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met
85 90 95

Thr Glu Glu Ala Ala Val Ala Ile Lys Ala Met Ala Lys
100 105

<210> 13
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 13
caggtctaga gttggaatcg aagc

24

<210> 14
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 14
atatctcgag ccttgattgc aacagctgcc

30

<210> 15
<211> 489
<212> DNA
<213> Rattus sp.

<220>
<221> CDS
<222> (33)..(485)

<400> 15
caggtctaga gttggaatcg aagcctctta aa atg gca gat gat ttg gac ttc 53
Met Ala Asp Asp Leu Asp Phe
1 5

gag aca gga gat gca ggg gcc tca gcc acc ttc cca atg cag tgc tca 101
Glu Thr Gly Asp Ala Gly Ala Ser Ala Thr Phe Pro Met Gln Cys Ser
10 15 20

gca tta cgt aag aat ggt ttt gtg gtg ctc aag ggc cgg cca tgt aag 149
 Ala Leu Arg Lys Asn Gly Phe Val Val Leu Lys Gly Arg Pro Cys Lys
 25 30 35
 atc gtc gag atg tct act tcg aag act ggc aag cat ggc cat gcc aag 197
 Ile Val Glu Met Ser Thr Ser Lys Thr Gly Lys His Gly His Ala Lys
 40 45 50 55
 gtc cat ctg gtt ggt att gat att ttt act ggg aag aaa tat gaa gat 245
 Val His Leu Val Gly Ile Asp Ile Phe Thr Gly Lys Lys Tyr Glu Asp
 60 65 70
 atc tgc ccg tcg act cat aac atg gat gtc ccc aac atc aaa agg aat 293
 Ile Cys Pro Ser Thr His Asn Met Asp Val Pro Asn Ile Lys Arg Asn
 75 80 85
 gat ttc cag ctg att ggc atc cag gat ggg tac cta tcc ctg ctc cag 341
 Asp Phe Gln Leu Ile Gly Ile Gln Asp Gly Tyr Leu Ser Leu Leu Gln
 90 95 100
 gac agt ggg gag gta cga gag gac ctt cgt ctg cct gag gga gac ctt 389
 Asp Ser Gly Glu Val Arg Glu Asp Leu Arg Leu Pro Glu Gly Asp Leu
 105 110 115
 ggc aag gag att gag cag aag tat gac tgt gga gaa gag atc ctg atc 437
 Gly Lys Glu Ile Glu Gln Lys Tyr Asp Cys Gly Glu Glu Ile Leu Ile
 120 125 130 135
 aca gtg ctg tcc gcc atg aca gag gag gca gct gtt gca atc aag gct 485
 Thr Val Leu Ser Ala Met Thr Glu Glu Ala Ala Val Ala Ile Lys Ala
 140 145 150
 cgag 489

<210> 16
 <211> 151
 <212> PRT
 <213> Rattus sp.

<400> 16
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 1 5 10 15
 Thr Phe Pro Met Gln Cys Ser Ala Leu Arg Lys Asn Gly Phe Val Val
 20 25 30
 Leu Lys Gly Arg Pro Cys Lys Ile Val Glu Met Ser Thr Ser Lys Thr
 35 40 45
 Gly Lys His Gly His Ala Lys Val His Leu Val Gly Ile Asp Ile Phe
 50 55 60
 Thr Gly Lys Lys Tyr Glu Asp Ile Cys Pro Ser Thr His Asn Met Asp
 65 70 75 80
 Val Pro Asn Ile Lys Arg Asn Asp Phe Gln Leu Ile Gly Ile Gln Asp
 85 90 95

Gly Tyr Leu Ser Leu Leu Gln Asp Ser Gly Glu Val Arg Glu Asp Leu
 100 105 110
 Arg Leu Pro Glu Gly Asp Leu Gly Lys Glu Ile Glu Gln Lys Tyr Asp
 115 120 125
 Cys Gly Glu Glu Ile Leu Ile Thr Val Leu Ser Ala Met Thr Glu Glu
 130 135 140
 Ala Ala Val Ala Ile Lys Ala
 145 150

<210> 17
 <211> 20
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 17
 gtctgtgtat tattggggccc 20

<210> 18
 <211> 42
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 18
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<210> 19
 <211> 18
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 19
 ttgaaggggt gaggaaaa 18

<210> 20
 <211> 15
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 20
ttgagtggga taaag

15

<210> 21
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 21
aatcatctgc cattttaa

18